

female when she was presented with a chameleon and soon after mounted for less than five seconds. This female was later collected and proved to be in breeding condition. The oviduct appeared to be swollen, the largest ovum measuring 9 mm.

From the foregoing it would appear that clutches would not be completed before the end of September or early October.

*Epilogue:* On 23rd October the tree at the second site was climbed by the same Malgache guide as before. The nest then held three eggs of which two were broken; all heavily incubated. Hery Christophe, the Forest Guard, forwarded the remaining egg to me. It is yellowish, rather evenly speckled and stippled with light yellowish-brown, the markings tending to be darker brown on the broader end. The dull and yellowish markings are probably due to the length of incubation. The egg measures  $42.8 \times 33.7$  mm. The average of 48 eggs of the much smaller *F. newtoni* is given as  $35.8 \times 28.8$  mm (Brown & Amadon).

*Summary:* Three pairs of the Madagascar Banded Kestrel *Falco zoniventris* were studied in north-east Madagascar during two weeks in September. Pre-egg-laying behaviour and nesting sites are recorded for the first time, together with the first known egg of this falcon.

*Acknowledgements:* My thanks are primarily due to Professor Charles Sibley, of Yale University, for enabling me to visit Madagascar and for many other kindnesses, not least for criticizing a preliminary draft of this paper. I was helped in the field by Jali Makawa (a wonderful companion), Michel Rakotonirina (my interpreter) and Hery Christophe (and his two able assistants, Robeson and Tizzy Antoin, who collected the egg of the Banded Kestrel). Others who have helped in several ways are C. W. Benson, R. J. Dowsett, P. Griveaud, and R. Wagstaffe. J. M. Andriamampianina, Chef des Eaux et Forets, was particularly helpful in granting permits and in many other ways.

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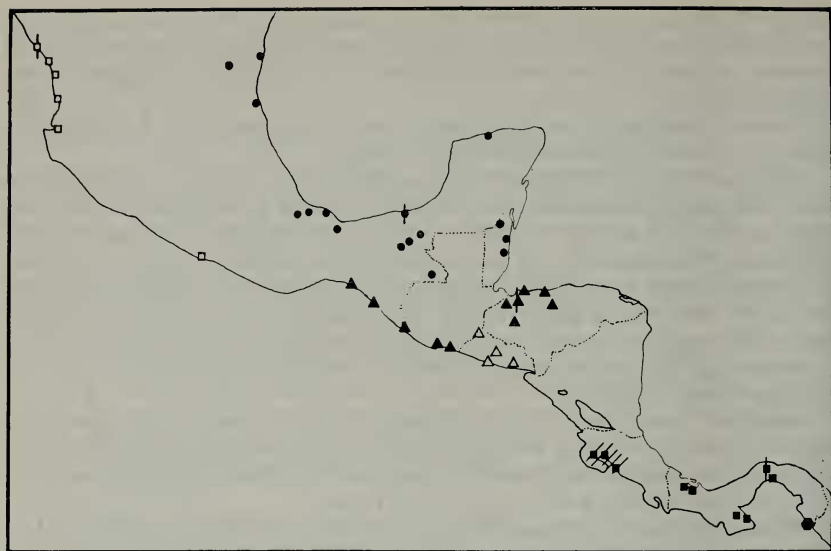
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## A review of the Boat-billed Heron *Cochlearius cochlearius*

by Robert W. Dickerman

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The relationship of the Boat-billed Heron *Cochlearius cochlearius* at the sub-familial, familial and tribal levels within the order Ciconiiformes has recently been discussed by Bock (1956), Cracraft (1967) and Dickerman (1971), but the subspecific variation within the species has not been reviewed since the description of *C. c. panamensis* Griscom (1926). During the course of investigations on the possible role of birds in the ecology of arboviruses in Mexico and Guatemala, and on the nesting biology of *Cochlearius* in Mexico (Dickerman & Juarez 1971; Juarez & Dickerman 1972), series of Boat-billed Herons have been collected that, together with the limited amount of material already available in museum collections, have permitted this review of the Mexican and Central American populations. Measurements were recorded to the nearest millimetre (Table).



FIGURE

Distribution of the races of *Cochlearius cochlearius* in Mexico and Central America. Open squares, *zeledoni*; circles, *pbillipsi*; triangles, *ridgwayi* (open triangles, localities reported in Dickey & Van Rossem 1938); squares, *panamensis*; hexagon *cochlearius*. Localities with vertical lines are type localities. Hatched region represents intergrade zone *panamensis* × *ridgwayi*.

TABLE

Measurements in millimetres of adult Boat-billed Herons from Central America, with mean and standard deviation

	Males			
	wing chord	tail	tarsus	exposed culmen
East Coast Mexico	265-296 (281.9) SD 7.8 n=28	110-122 (114.8) SD 3.5 n=28	72-87 (79.9) SD 3.2 n=29	78-92 (85.2) SD 3.3 n=29
West Coast Mexico S. to Isthmus of Tehuantepec	259-273 (269.6) SD 3.3 n=14	102-110 (106.6) SD 2.2 n=14	71-83 (79.4) SD 3.0 n=16	78-88 (83.7) SD 2.8 n=16
Pacific coastal Chiapas (Mexico), Guatemala and Honduras	262-283 (271.5) SD 6.6 n=16	105-114 (110.1) SD 3.3 n= 16	71-83 (79.2) SD 3.1 n=14	78-87 (83.6) SD 3.9 n=14
	Females			
	wing chord	tail	tarsus	exposed culmen
East Coast Mexico	268-281 (274.7) SD 4.5 n=15	108-116 (111.8) SD 2.5 n=16	71-81 (74.7) SD 2.6 n=15	72-84 (78.2) SD 3.9 n=16
West Coast Mexico S. to Isthmus of Tehuantepec	258-273 (264.6) SD 4.4 n=10	100-107 (104.0) SD 3.4 n=10	73-78 (75.4) SD 1.9 n=10	76-82 (78.6) SD 1.8 n=10
Pacific coastal Chiapas (Mexico), Guatemala and Honduras	255-274 (268.3) SD 6.9 n=14	105-116 (109.4) SD 3.0 n=19	66-78 (73.1) SD 3.2 n=14	72-81 (76.7) SD 2.7 n=14

*Cochlearius cochlearius zeledoni*

*Cancroma zeledoni* Ridgway (1885). Type locality, Mazatlan, State of Sinaloa, Mexico.

*Diagnosis*: Pale "lavender" grey dorsally, forehead usually whitish, washed with pale-grey or buff: wing and tail shorter than in the birds of the Gulf coastal lowlands of Mexico.

*Range*: Pacific coastal areas of Mexico from Mazatlan, Sinaloa, south at least to the Rio Papagallo, Guerrero (see Figure).

*Cochlearius cochlearius phillipsi* new subspecies

*Type:* Adult male no. 803,080 American Museum of Natural History, collected ca. eight km east of Atasta, State of Campeche, Mexico, 13th February 1966 by Robert W. Dickerman (original field number RWD 13,677). Testes  $27 \times 13$  and  $23 \times 13$  mm.

*Diagnosis:* Similar to *zeledoni* but much larger (Table); paler on chest and sides of neck than the population of the Pacific lowlands of Chiapas and Central America.

*Range:* Gulf and Caribbean coastal zone of Mexico from La Pesca, State of Tamaulipas, south to Belize. Probably intergrades with the next form in the Caribbean lowlands of Guatemala from whence no material is available.

It is a pleasure to name this form in honour of Dr. Allan R. Phillips who is so generous in sharing with others his knowledge of the Mexican avifauna.

*Cochlearius cochlearius ridgwayi* new subspecies

*Type:* Adult male no. 134, 122 Carnegie Museum, collected at Coyoles, Department of Yoro, Honduras, on 17th June 1950 by Arthur C. Twomey and Roland W. Hawkins (original field number 14,293). Noted as "breeding", "TGE" (testes greatly enlarged).

*Diagnosis:* Similar dorsally to *zeledoni* but breast a richer, deeper, vinaceous; much paler throughout than *panamensis*. Averages smaller than *phillipsi* but larger than *zeledoni*. The breeding birds of the Pacific coastal area of Chiapas (and those of adjacent Guatemala), while showing the subspecific characters, average slightly paler than Honduras specimens.

*Range:* Pacific coastal areas of State of Chiapas, Mexico; Guatemala; and at least the Caribbean lowlands of Honduras. The range of *ridgwayi* is disjunct from the southern part of the range of *zeledoni* by approximately 450 km in the Isthmus of Tehuantepec region. On the Caribbean lowlands there is a sharply-stepped cline between Belize and the type locality of *ridgwayi*. Unfortunately no adult specimens are available from the intervening coastal region of Guatemala. Locality records for El Salvador from whence no specimens were examined are taken from Dickey & Van Rossem (1938).

This form is named with respect for Mr. Robert Ridgway whose works form the backbone of American ornithology.

*Cochlearius cochlearius panamensis*

*Cochlearius cochlearius panamensis* Griscom (1926), type locality Corozal, Canal Zone.

*Diagnosis:* Much darker, more olive above than the clear grey of the northern races; also more olive, less vinaceous, on sides of neck.

*Range:* Costa Rica: Boca Rio Matima, Limon, Boca Mala, Puntarenas (Hellmayr & Conover 1948); intergrades with *ridgwayi* in Guanacaste. Panama: throughout Republic except southwestern Darien (Wetmore 1965).

Unfortunately this form is exceedingly poorly represented in collections. I have seen only six specimens that I consider to be adult.

*Cochlearius cochlearius cochlearius*

*Cancroma Cochlearius* Linnaeus (1766), type locality Cayenne.

*Diagnosis:* Adult, very much paler grey dorsally and on sides of neck, upper breast and all of foreneck pure white. Immature, back and wing coverts richer cinnamon than Central American forms.

*Range*: South America in suitable habitat from extreme southern Panama south to northern Argentina.

To date I have not studied South American specimens of the Boat-billed Heron and follow other authors in considering them all to represent the nominate form.

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## Composite nest of Short-crested Flycatcher

*Myiarchus ferox*

by P. J. K. Burton

Received 7th May, 1973

During January to April 1972, I accompanied the British-Trans Americas Expedition on its vehicle crossing of the Darien Gap (Eastern Panama and North-western Colombia). On 26th March, I was at La Lomas de Rumie, a spur of high ground jutting out into the Atrato swamp near the Rio Perancho. Walking along an isolated rough road bordering the swamp, I observed a Short-crested Flycatcher *Myiarchus ferox* carrying nest material. Through watching the bird, I quickly located the nest which was about 12 feet above